# Technology Opportunity

## Video Event Trigger

The National Aeronautics and Space Administration (NASA) seeks to transfer the NASA-developed video signal analyzer and event trigger. It is currently available in circuit-board form for IBM–PC-style desktop computers.

### Potential Commercial Uses

- Auto crash safety tests
- Scientific research
- Quality control and inspection in high-speed assembly lines
- Detection of reactions in long-term biological experiments
- Security monitoring of parking lots and hallways at night
- Detection of fires, melting, leakage, weather changes

### Benefits

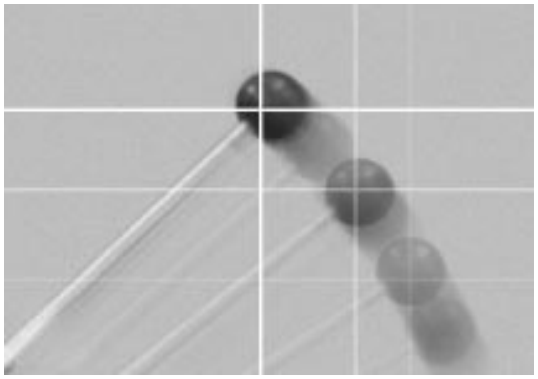
- Designed for high speed applications
- Artificial intelligence, similar to a robot
- Continuous, 24 hour-a-day monitoring—no interruptions, coffee breaks, or vacations
- Tolerant of hazardous areas—prevents worker injury or health hazard
- Can use a video image of an interesting event as a reference
- Can be "trained" to watch for rapidly or slowly varying images
- Programmable for sensitivity and certain shades that are of interest

### The Technology

This system was developed as part of NASA's search for ways to accelerate video image analysis for space applications. Ongoing and future microgravity experiments aboard the space shuttle or the space station require high-resolution, high-frame-rate video technology to replace high-speed photographic movie film, which is heavy and bulky and cannot be processed in space. Digitized output from such a high-rate-video stream presents a difficult data storage problem when data are produced at rates of 300 Mbytes per second or higher. One way to minimize data storage requirements and cost would be to store only the "important"digitized images. These are the images containing information about the experiment, captured in the localized motion around some significant physical event. In microgravity experiments, these video events often happen after minutes or hours of prior inactivity.

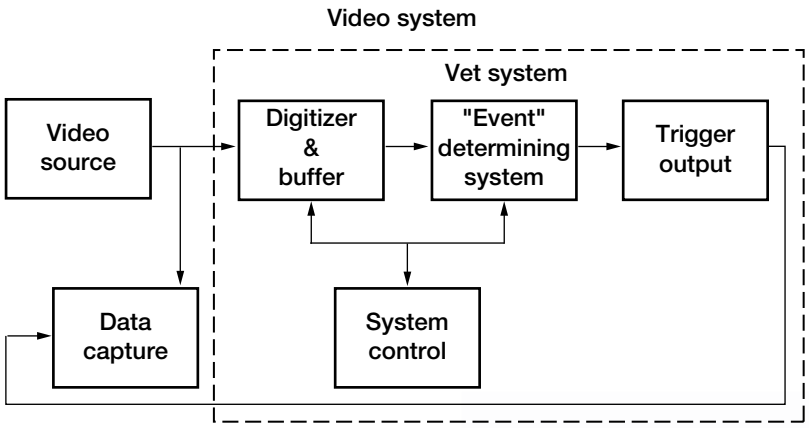
The circuitry attaches to a commercial "frame grabber" in a PC. Using a bank of high-speed fuzzy logic comparators, it breaks a video image into pieces and rapidly scans and compares the pieces for various kinds of differences. The trigger event is extracted by a special processor capable of parallel processing 96 million pixels per second, searching for picture changes caused by one or more of the following changes, depending on how it is programmed.

- Motion within the area of interest
- Color change within the area of interest, with no motion
- Sudden and complete disappearance (or appearance) of an object in the area of interest
- Sudden change of shape of an object in the area of interest



The video event trigger in operation.

National Aeronautics and Space Administration
Lewis Research Center



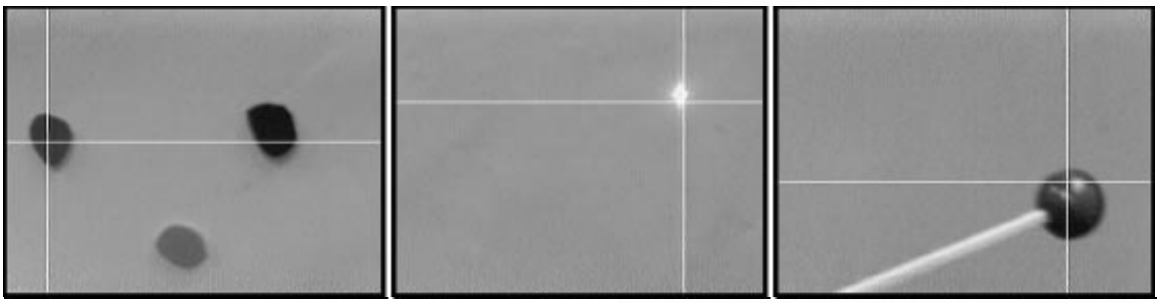




Figure shows video system triggering (a) on a specific shade; (b) on a moving bright object; (c) on a moving dark object.

The circuit "learns" what is normal, then waits for the specified kind of change. Detection of a change is registered within 0.005 second after the video image is made available from the frame grabber, a speed needed for high-frame-rate applications.

## Options for Commercialization

The circuit is patented (U.S. Patent Number 5,539,454); however it is available to be licensed and modified to suit a specific application. Using custom VLSI integrated circuit technology, the licensee can vary the design and shrink the packaging. Existing circuit boards are available for licensing.

## Contact

Glenn L. Williams
Phone: (216) 433-2389
or
Michael Lichter
Phone: (216) 433-8588
Mail Stop 86-5
NASA Lewis Research Center
21000 Brookpark Road
Cleveland, OH 44135
Fax: (216) 433-6382

## Key Words

Fuzzy logic
Video motion
Trigger
Frame grabber



National Aeronautics and Space Administration
Lewis Research Center